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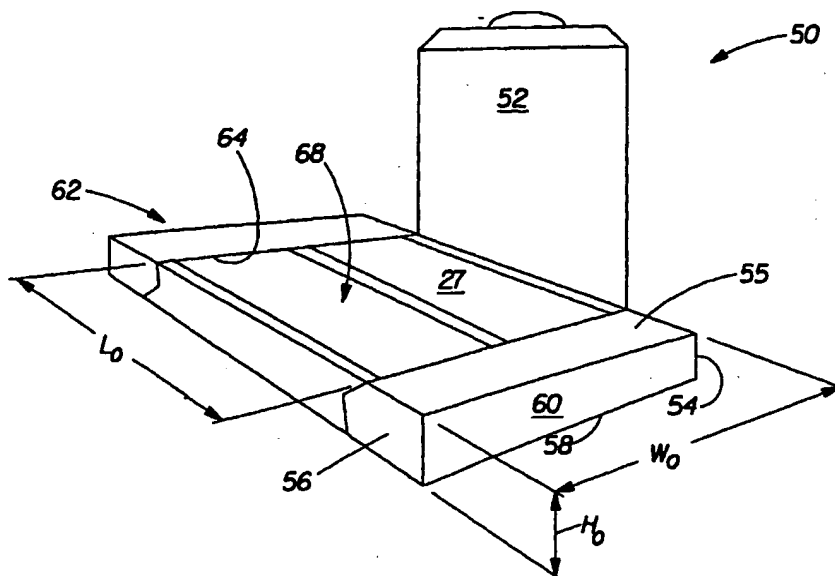
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(54) Title: PACKAGES FOR STORING SHEETS FOR CLEANING IMPLEMENTS



(57) Abstract: A package (50) for storing a plurality of sheets (27) used with a mop having a mop head with a plurality of attachment structures for retaining a sheet about the mop head is provided. The package (50) includes a container having a front wall (56), side walls (60, 62), a rear wall (54) and a bottom wall (58), wherein the walls form a compartment. A plurality of sheets (27) having a deformable scrim are stored within the compartment, wherein the sheets (27) are folded about at least one longitudinal axis of the sheets. A lid (52) closes an opening in the container through which the sheets (27) can be removed.

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## **PACKAGES FOR STORING SHEETS FOR CLEANING IMPLEMENTS**

### **TECHNICAL FIELD OF THE INVENTION**

The present invention relates to the field of packages for storing sheets for cleaning implements, and, more particularly, to the field of packages for sheets which are used with a floor mop having attachment structures for retaining a sheet about a mop head.

### **BACKGROUND OF THE INVENTION**

Mops which utilize a sheet, such as a woven or non-woven sheet, for cleaning are known in the art. These mops can be used to clean floors and the like and typically comprise a mop head and a handle pivotally connected to the mop head by a universal joint. Various structures have been used to secure the sheet to the mop head. For example, US patent no. 5,815,878 to Murakami et al. discloses a sweeping device having a sweeper head with a pair of clamping members while JP3022675 appears to disclose a mop having a plurality of serrated structures located on the mop head for receiving a sheet. Because the sheets used with these types of mops are disposable and therefore replaced after each use, it is often desirable to bundle together and market multiple sheets as unit for a consumer. While such sheets have been bundled together in non-resealable flexible pouches having slit-like openings, often times these sheets can be deformed during storage or removal from or reinsertion to the pouch such that their cleaning performance is degraded and/or the portion of the sheet which attaches to the mop cannot engage the mop head as effectively as it would prior to deformation. Further, some cleaning sheets may have three-dimensional surfaces which aid in the collection and retention of particulates within the sheet but which can also be susceptible to deformation. Therefore, there exists a need to provide improved packages which can protect the shape and/or three-dimensionality of these sheets. Further, there exists a need to provide

improved package and sheet combinations which can accommodate removal and reinsertion of sheets without substantial deformation.

### **SUMMARY OF THE INVENTION**

A package for storing a plurality of sheets used with a mop having a mop head with a plurality of attachment structures for retaining a sheet about the mop head is provided. The package includes a container having a front wall, side walls, a rear wall, and a bottom wall, wherein the walls form a compartment. A plurality of sheets having a deformable scrim are stored within the compartment, wherein the sheets are folded about at least one longitudinal axis of the sheets. A lid is attached to one of the walls, wherein the lid closes an opening in the container through which the sheets can be removed. In a more preferred form, the opening of the package has a length at least about 40% of the length of the sheets stored in the compartment and, more preferably, has a width at least about 50% of the width of the sheets stored in the compartment.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

While the specification concludes with claims particularly pointing out and distinctly claiming the invention, it is believed that the present invention will be better understood from the following description taken in conjunction with the accompanying drawings in which:

Fig. 1 is a perspective view of an exemplary floor mop suitable for use with the present invention;

Fig. 2 is a perspective view of the floor mop of Fig. 1, wherein the mop has a sheet attached thereto;

Fig. 3 is a perspective view of a preferred sheet suitable for use with the floor mop of Fig. 1;

Fig. 4a is schematic plan view of the preferred sheet of Fig. 4a illustrating the basis weight differences of the sheet;

Fig. 4b is a photomicrograph of the preferred sheet of Fig. 3 showing a textured three-dimensional surface;

Fig. 5 is a top view of the floor mop of Fig. 1;

Fig. 6 is a cross-sectional side view of the mop head of Fig. 5, taken along line 6-6 thereof;

Fig. 7 is a perspective view of a package made in accordance with the present invention, wherein the lid is in the raised position;

Fig. 8 is a perspective view of the sheet of Fig. 3, wherein the sheet is folded about the two longitudinal axes; and

Fig. 9 is a perspective view of the sheet of Fig. 3, wherein the sheet is folded about two longitudinal axes and a transverse axis.

#### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Reference will now be made in detail to the present preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings wherein like numerals indicate the same elements throughout the views. As will be appreciated, the present invention is directed to packages for storing sheets which are adapted for use with a cleaning implement and, more preferably, to packages for storing sheets which are adapted for use with a floor mop. Referring to Figs. 1 and 2, an exemplary floor mop 20 is illustrated. The mop 20 comprises a mop head 22 and a handle 24 pivotally connected to the mop head 22 by a universal joint 26. As shown in Fig. 2, a sheet 27, which can be provided in the form of a woven or non-woven fabric, is attached to the mop head 22 for collecting dust, dirt, and other material during use. The sheet 27 is attached to the mop head 22 by a plurality of attachment structures 34. The mop head 22 includes an elastic member 28 which is disposed about the periphery of the mop head 22 and which both tensions the sheet 27 about the mop head 22 and provides a support surface for the sheet

27. The elastic member 28 has a length  $L_M$  and a width  $D_M$ , wherein the length  $L_M$  is preferably between about 20 cm and about 30 cm and the width  $W_M$  is between about 8 cm and about 12 cm. As used herein, the phrases "cleaning head" and "mop head" are intended to refer to the structure which engages and retains the sheet 27. The mop head 22, and universal joint 26 are preferably formed from ABS type-polymers (e.g., terpolymer from acrylonitrile), polypropylene or other plastic material by injection molding while attachment structures 34 are preferably formed from injection molded polyethylene and the elastic member 28 is preferably formed from polyurethane by molding. The handle 24 can be formed from plastic, aluminum, or other structural materials.

As will be appreciated, the floor mop 20 and mop head 22 illustrated in the accompanying Figures are but one configuration which is suitable for use with the present invention. The mop head 22 can be provided in other shapes and sizes and may be configured for other types of cleaning, such as cleaning walls, around corners, furniture and the like. Also, while the present invention is discussed herein with respect to a floor mop for purposes of simplicity and clarity, it will be understood that the present invention can be used with other types of cleaning implements having other types of cleaning heads with attachment structures for securing a sheet about the cleaning head. For instance, the present invention can be used with other types of floor mops, wall and other smaller hand-held dusters, wet mops which utilize a cleaning solution, etc.

Preferred sheets which are suitable for use with the present invention are more fully described in US patent application serial nos. 09/082,349 entitled "Novel Structures Useful As Cleaning Sheets", filed May 20, 1998; and 09/082,396 entitled "Novel Three Dimensional Structures Useful As Cleaning Sheets", filed May 20, 1998, both of which are hereby incorporated herein by reference. The sheets described in these applications preferably comprise two components: a polymeric net or scrim 29 and a fibrous material 30 which is laid upon the scrim 29, as shown schematically in Fig. 3, by lamination via heat or chemical means such as adhesives or by hydrogentanglement. Scrim materials useful herein are described in detail in U.S. Patent No. 4,636,419, which is incorporated by reference herein. The scrims may be formed directly at the extrusion die or can be

derived from extruded films by fibrillation or by embossment, followed by stretching and splitting. The scrim may be derived from a polyolefin such as polyethylene or polypropylene, copolymers thereof, poly(butylene terephthalate), polyethylene terephthalate, NYLON 6, NYLON 66, and the like. Scrim materials are available from various commercial sources. A preferred scrim material useful in the present invention is a polypropylene scrim, available from Conwed Plastics of Minneapolis, MN.

The sheets also preferably have a continuous high and discrete low basis weight regions 32 and 33, respectively, such as shown schematically in Fig. 4a, and/or a three-dimensional surface, such as shown in Fig. 4b, both features being more fully described in US patent application serial nos. 09/082,349 and 09/082,396. While the low basis weight regions are depicted as being of essentially the same size and of a single well defined shape, these regions may be of differing sizes to facilitate entrapment of particles of varying size and shape. The high and low basis weight regions and the three dimensionality of the surface of the sheet shown in Figs. 4a and 4b assists in receiving and trapping material, such as dust and dirt, in the sheet.

The sheets 27 can be made using either a woven or nonwoven process, or by forming operations using melted materials laid down on forms, especially in belts, and/or by forming operations involving mechanical actions/modifications carried out on films. The structures are made by any number of methods (e.g., spunbonded, meltblown, resin bonded, air-through bonded, etc.), once the essential three dimensional and basis weight requirements are known. However, the preferred structures are nonwoven, and especially those formed by hydroentanglement as is well known in the art, since they provide highly desirable open structures. Also preferred are heat-bonded nonwoven structures which utilize continuous filaments bonded to a base sheet via heat-sealed lines.

Materials particularly suitable for forming the fibrous material 30 of sheet 27 include, for example, natural cellulose as well as synthetics such as polyolefins (e.g., polyethylene and polypropylene), polyesters, polyamides, synthetic cellulose (e.g., RAYON®), and blends thereof. Also useful are natural fibers, such as cotton or blends thereof and those derived from various cellulosic sources. Preferred starting materials for making the hydroentangled fibrous sheets of the present invention are synthetic materials,

which may be in the form of carded, spunbonded, meltblown, airlaid, or other structures. Particularly preferred are polyesters, especially carded polyester fibers. The degree of hydrophobicity or hydrophilicity of the fibers is optimized depending upon the desired goal of the sheet, either in terms of type of soil to be removed, the type of additive that is provided, when an additive is present, biodegradability, availability, and combinations of such considerations. In general, the more biodegradable materials are hydrophilic, but the more effective materials tend to be hydrophobic. The sheets 27 preferably have a width  $W_S$  and length  $L_S$  and, preferably, the width  $W_S$  is between about 18 cm and about 22 cm while the length  $L_S$  is between about 25 cm and about 35 cm for an elastic member having a width  $W_M$  between about 8 cm and about 12 cm and a length  $L_M$  between about 20 cm and about 30 cm. While the above-described sheets are preferred, it will be understood that other sheet materials, dimensions, and constructions may be equally suitable for use with the present invention.

The sheets 27 are attached to the mop head 22 by a plurality of attachment structures 34. The attachment structures 34 are configured to receive and retain the sheet 27 about the mop head 22, as shown in Fig. 2, during use. The attachment structures 34 are preferably disposed at the corners of the mop head 22, although these locations can be varied depending upon the size and shape of the mop head 22. As best seen in Figs. 5 and 6, the attachment structures 34 each preferably comprise a base triangle 36 which is defined along two sides thereof by slits 38 which extend through the flexible material which forms the attachment structures 34. The attachment structures 34 also preferably comprise a plurality of pie-shaped sections 42 having apexes 44. The pie-shaped sections 42 are defined along two sides thereof by slits 48 which extend through the flexible material which forms the attachment structures 34. This arrangement permits the pie-shaped sections 42 to individually deflect relative to each other. The slits through the flexible material of the attachment structure 34 allow the pie-shaped sections 42 and the base triangle 36 to deflect under finger pressure so that a portion of the sheet 27 can be pushed through the top surface of the attachment structures 34 and into a cavity 49 (Fig. 6) formed within the attachment structures 34. As the sheet 27 is pushed past the top surface of an attachment structure 34, the apexes 44 of the pie-shaped sections 42 and the

apex 40 of the base triangle 36 can pierce and engage the sheet 27 such that the sheet is retained about the mop head 22 during use.

While the above-described dry mop is preferred, it will be understood that other arrangements, materials and configurations would be equally suitable for use with the present invention. For example, other joints can be used in place of the universal joint 26 to provide relative movement between the handle 24 and the mop head 22 and the mop head 22 can be provided in the form of other shapes and configurations (e.g., with a textured bottom surface, curvilinear side walls, etc.). Further, while the attachment structures 34 are preferred, it will be appreciated that the dry mop 20 can incorporate other configurations for the attachment structures 34. For example, hinged clamps can be provided or the sheets can be attached to the mop head 22 using hook and loop fasteners. While the attachment structures of the present invention are preferably used in combination with the dry mop 20, the attachment structures can be used with other cleaning implements as previously discussed.

As previously discussed, the scrim 29 provides a support structure for the fibrous material 30. However, semi-permanent and/or permanent deformations (e.g., "dog ears" and other irregularities) can be imparted to the scrim 29 (and therefore also to a sheet 27) if the scrim is pinched, crushed, or otherwise deformed. Such deformations can degrade not only the cleaning performance of the sheets 27 but also, if severe, affect engagement between the sheet 27 and the attachment structures 34.

In accordance with one aspect of the present invention, a preferred package 50 for storing the sheets 27 which can prevent undesirable deformations is illustrated in Fig. 7. The package 50 includes a lid 52 hingedly attached to a rear wall 54, a top wall 55, a front wall 56 disposed opposite the rear wall 54, a bottom wall 58, and opposing side walls 60 and 62. The lid 52, which is preferably recloseable, and the walls form a compartment 64 for storing the sheets 27. More preferably, the compartment 64 is sized to store between about 5 and about 100 sheets, and, more preferably, between about 8 and about 64 sheets. Perforations or, more preferably, scoring define the edges of the lid 52 as well as an opening 68 through which the sheets 27 can be removed. The scoring allow a user of the package 50 to easily separate the lid 52 from the top wall 55 to expose the compartment



64. The package 50 is preferably formed from paperboard, cardboard, corrugated cardboard or other suitable material and is substantially rigid. As used herein, the phrase "substantially rigid" is intended to refer to a package 50 whose height  $H_0$  (Fig. 7), when subjected to a 7.5 lb load distributed across the top of the package 50, is at least about ninety percent and, more preferably, at least about ninety-five of the height  $H_0$  of the package 50 without an applied load. While package 50 has been illustrated herein as generally rectangular in plan view and the lid 52 has been described herein as hingedly attached to the rear wall 54, it will be appreciated that the walls and lid of package 50 can be provided in other shapes and configurations without departing from the scope of the present invention. For example, the lid 52 might be provided as detachable from the package 50.

Referring to Figs 3, 8, and 9, the sheets 27 which are stored in the compartment 64 are preferably folded about longitudinal and transverse axes of the sheet. More particularly, the sheet 27 is preferably folded about first and second longitudinal axes 70 and 72 (Fig. 3), wherein the width  $W_B$  between the longitudinal axes is about equal to the width  $W_M$  of the elastic member 28. In other words, portions 74 of a sheet 27 which engage the attachment structures 34 of the mop 20 are folded over on top of the base portion 76 (i.e., the portion defined by the width  $W_B$  as shown in Fig. 3) of the sheets 27, as shown in Figs. 8 and 9. Because the sheets 27 preferably comprise a deformable scrim 29, the portions 74 which engage the attachment structures 34 are protected from deformation by both the rigid package 50 and the fact that these portions are disposed interiorly of the walls of the package 50. Still further, the folding pattern for the sheets 27 provides a set of sheets whose three-dimensional surfaces are less likely to suffer deformation because of an "air cushion" which is established between the folded sheet layers.

The opening 68 of the package 50 is also preferably sized to prevent deformation of the sheets 27 and has a length  $L_0$  and a width  $W_0$  (Fig. 7) which are at least about 40% and 50%, respectively, of the folded length  $L_F$  and folded width  $W_F$  (Fig. 9) of the sheets 27. More preferably, the length  $L_0$  is between about 65% and about 85% of the folded length  $L_F$  and the width  $W_0$  is between about 80% and about 100% of the folded

width  $W_F$ . Most preferably, the opening 68 has a length  $L_O$  between about 10 cm and about 13 cm and a width  $W_O$  between about 11 cm and about 13 cm for a folded sheet 27 having a folded length  $L_F$  between about 13 cm and about 16 cm and a folded width  $W_F$  of between about 9 cm and about 12 cm. An opening 68 sized accordingly can allow a sheet 27 to be removed from and reinserted to the package 50 without damage. The sheets 27 are also preferably folded about the transverse axis 78 (Figs. 3 and 8) which is located at about the midpoint of the length  $L_S$ . Folding the sheet 27 about the transverse axis 78 permits the size of the opening 68 to still be maximized relative to the size of the folded sheet for removal from the package 50 while providing an overall package size which is convenient for storage.

The foregoing description of the preferred embodiments of the invention has been presented for purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise form disclosed. Modifications or variations are possible and contemplated in light of the above teachings by those skilled in the art, and the embodiments discussed were chosen and described in order to best illustrate the principles of the invention and its practical application. It is intended that the scope of the invention be defined by the claims appended hereto.

What is claimed is:

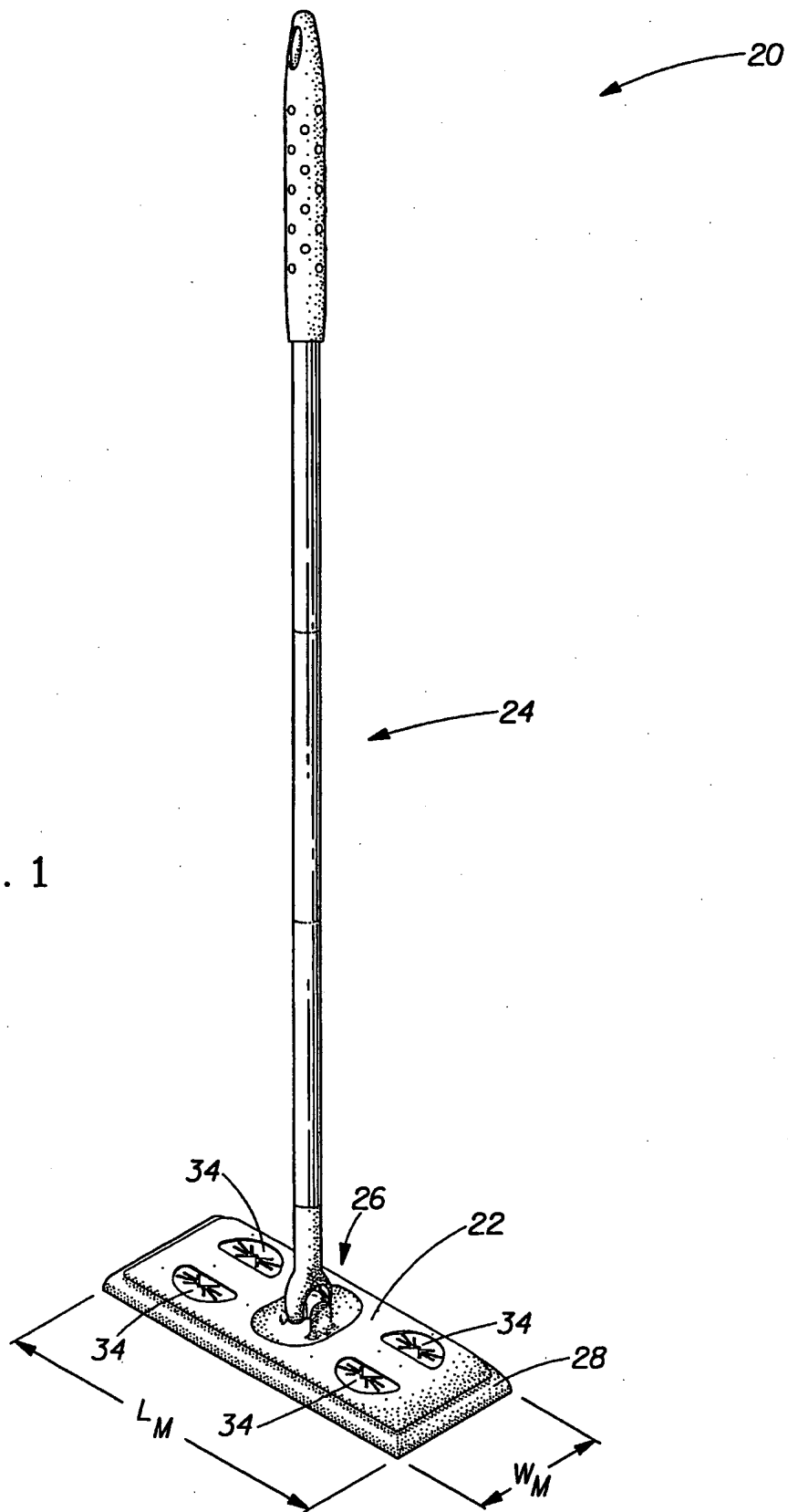
1. A package for storing a plurality of sheets used with a mop having a mop head, said mop head having a plurality of attachment structures for retaining a sheet about said mop head during use, said package comprising:  
  
a container having a front wall, side walls, a rear wall, and a bottom wall, said walls forming a compartment;  
  
a plurality of a sheets stored within said compartment having a deformable scrim, wherein said sheets are folded about at least one longitudinal axis of said sheets;  
and  
  
a lid closing an opening in said container through which said sheets can be removed.
2. The package of claim 1, wherein the surface of said sheets has a three dimensional structure.
3. The package of claim 1, wherein said sheets are folded about a second longitudinal axis of said sheets.
4. The package of claim 3, wherein said sheets are further folded about a transverse axis of said sheets
5. The package of claim 1, wherein said sheets have a length between about 13 cm and about 16 cm and a width of between about 9 cm and about 12cm after folding.
6. The package of claim 1, wherein said plurality of sheets comprises between about 5 and about 100 sheets.

7. The package of claim 1, wherein said package is formed from paperboard.
8. The package of claim 1, wherein said opening has a length at least about 40% of the length of said sheets stored in said compartment.
9. The package of claim 8, wherein said opening has a width at least about 50% of the width of said sheets stored in said compartment.
10. A package for storing a plurality of sheets used with a mop having a mop head, said mop head having a plurality of attachment structures for retaining a sheet about said mop head during use, said package comprising:
  - a container having a front wall, side walls, a rear wall, and a bottom wall, said walls forming a compartment;
  - a plurality of said sheets stored within said compartment, said sheets comprising a deformable scrim; and
  - a lid closing an opening in said container through which said sheets can be removed, wherein said opening has a length at least about 40% of the length of said sheets stored in said compartment.
11. The package of claim 10, wherein said opening has a width at least about 50% of the width of said sheets stored in said compartment.
12. The package of claim 10, wherein the surface of said sheets has a three dimensional structure.

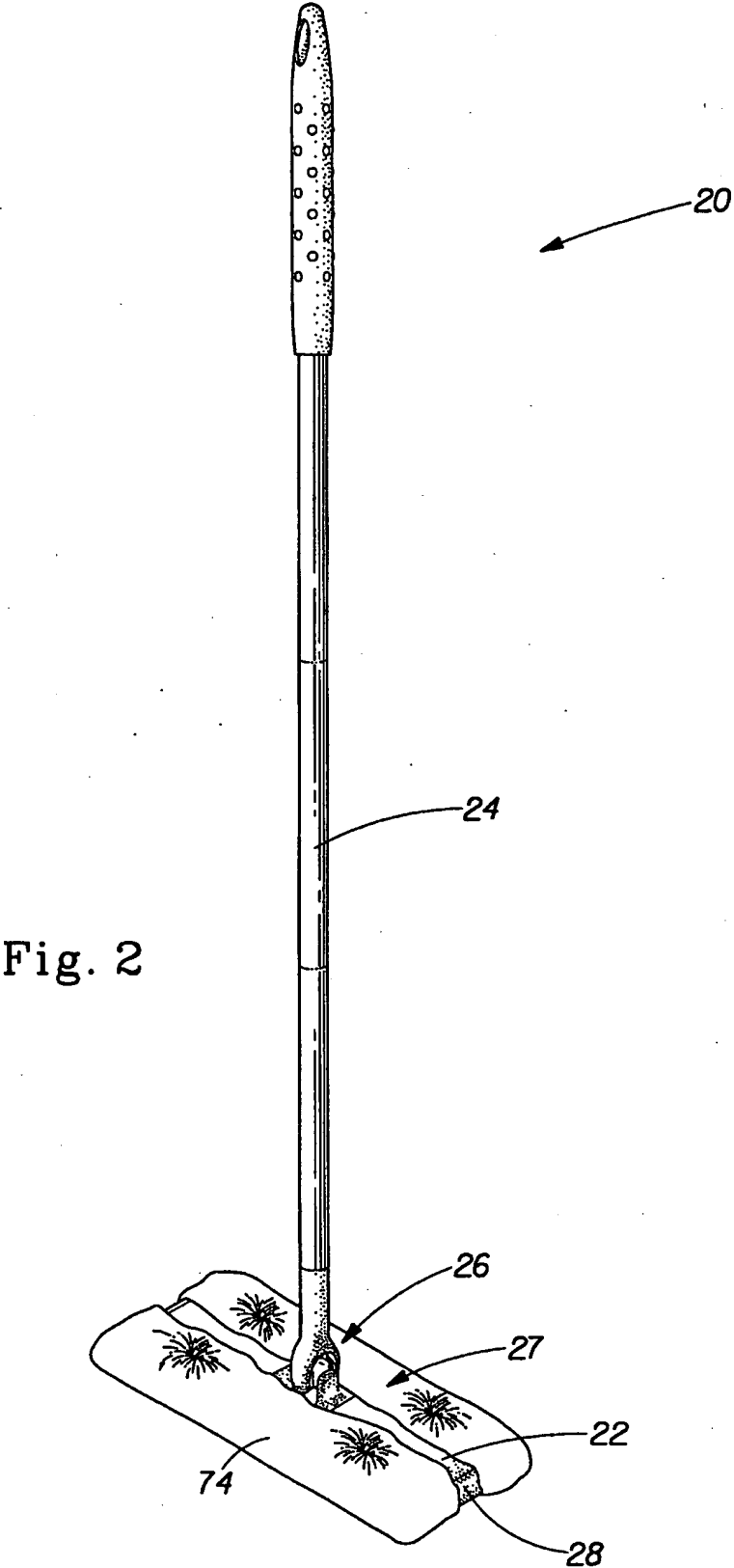
13. The package of claim 10, wherein said plurality of sheets comprises between about 8 and about 64 sheets.
14. The package of claim 10, wherein said package is formed from paperboard.
15. The package of claim 10, wherein said opening has a length between about 65% and about 85% of the length of said sheets stored in said compartment.
16. The package of claim 15, wherein said opening has a width between about 80% and about 100% of the width of said sheets stored in said compartment.

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Fig. 1



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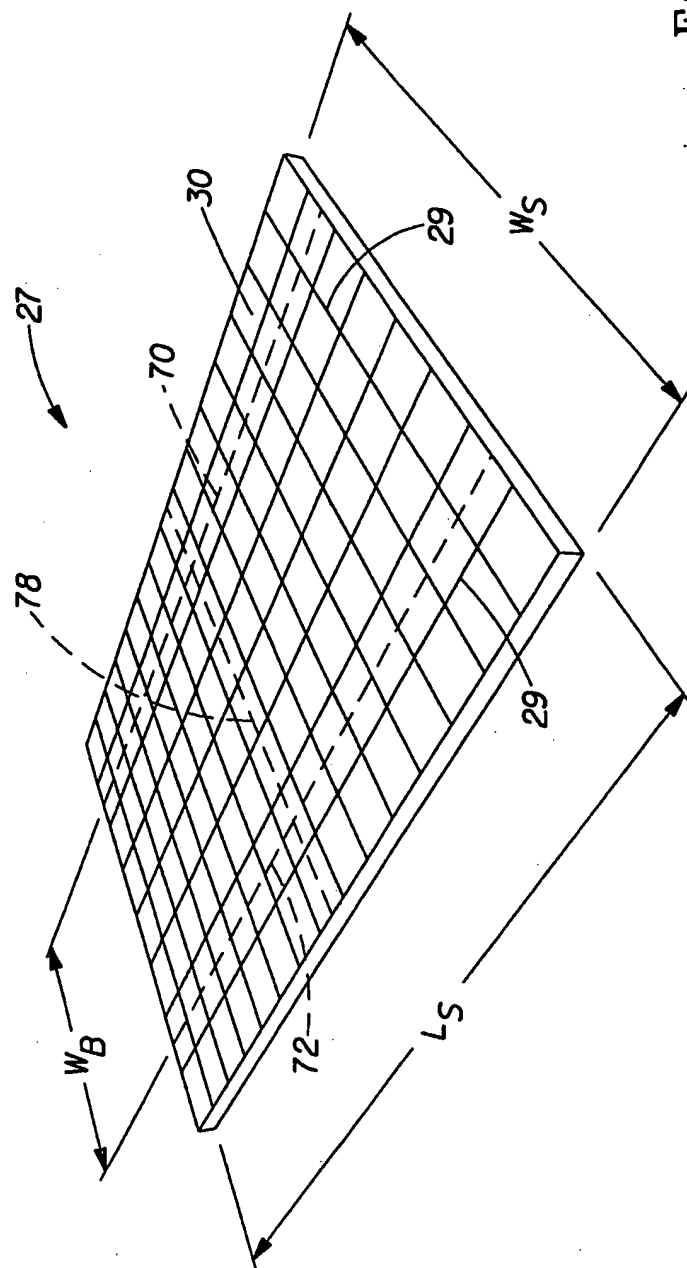


Fig. 3



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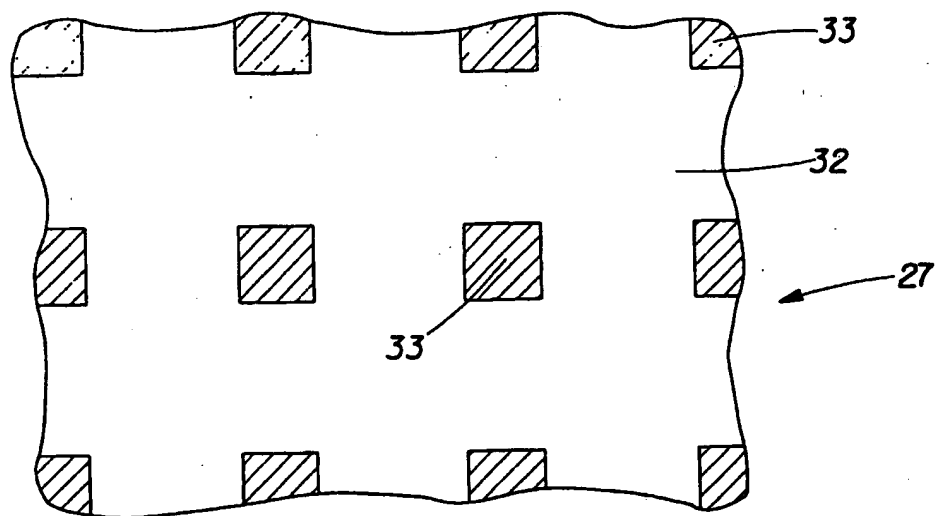


Fig. 4A



Fig. 4B

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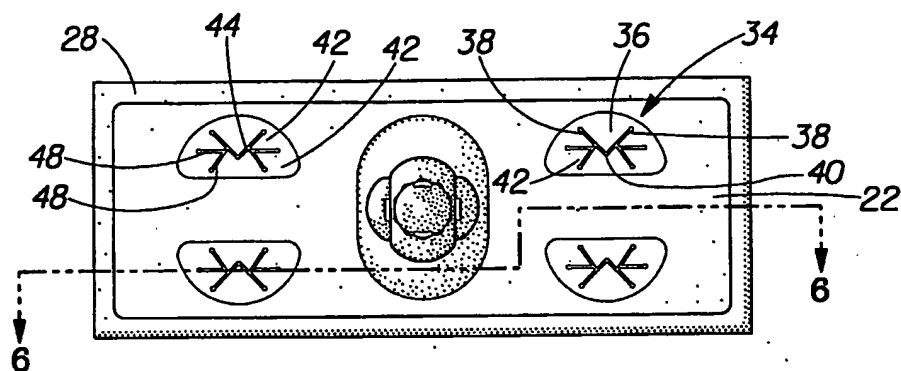


Fig. 5

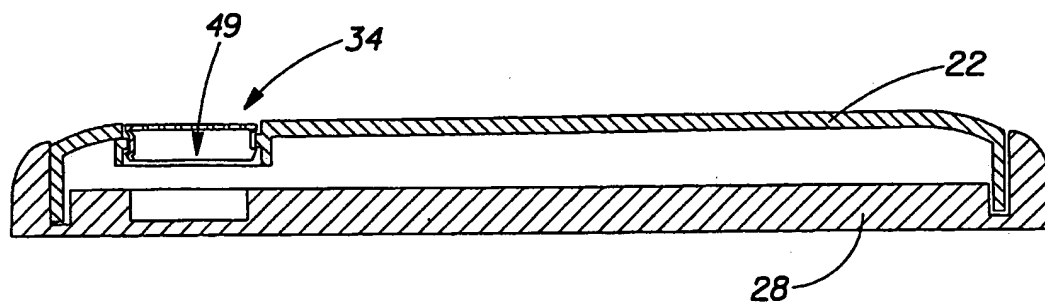
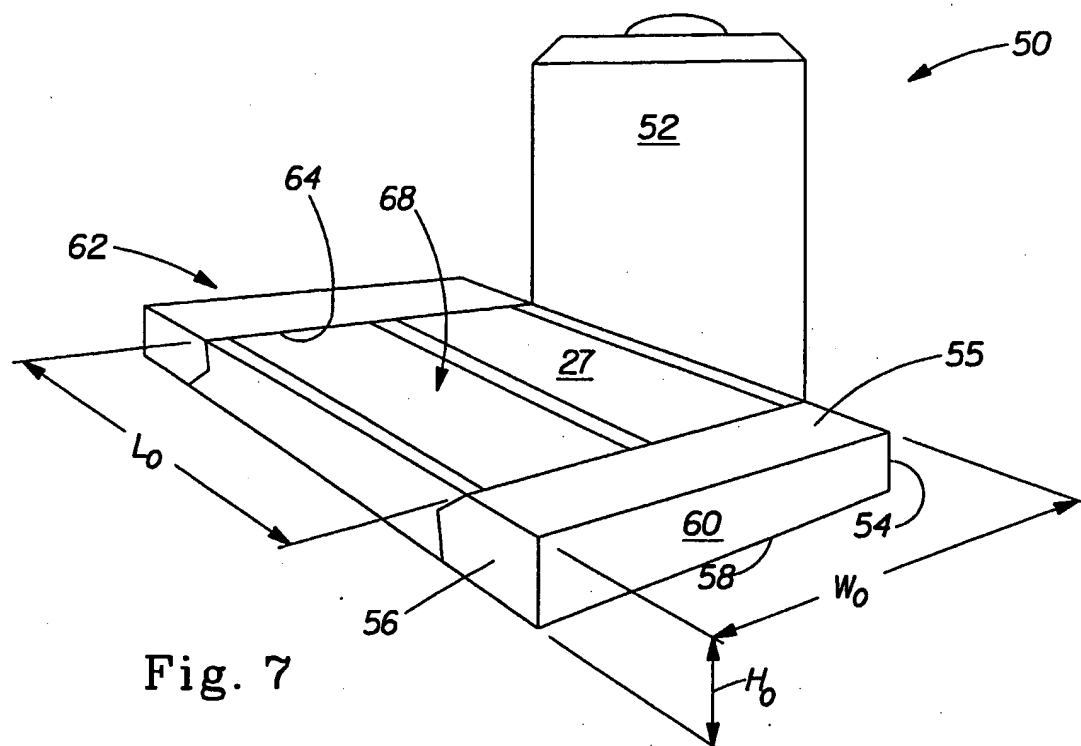
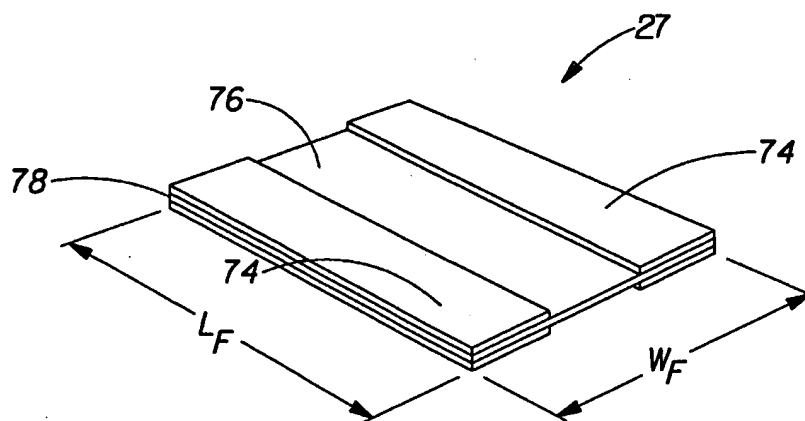
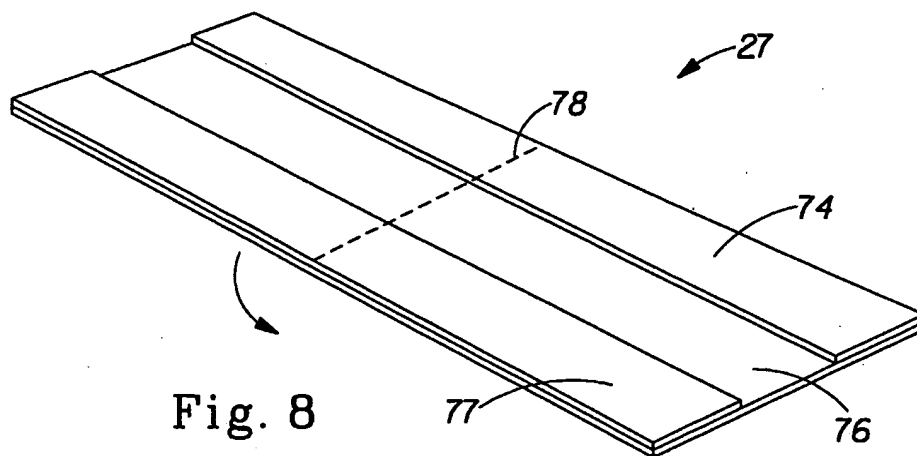


Fig. 6

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# INTERNATIONAL SEARCH REPORT

International Application No.

PCT/IB 00/01114

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B65D83/08 B65D5/54

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EP0-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 829 222 A (MINNESOTA MINING) 18 March 1998 (1998-03-18)	10-13, 15, 16
Y	column 3, line 24 - line 30 column 8, line 22 - column 10, line 15; figures 1, 4-7	1-9, 14
Y	US 5 577 612 A (CHESSON) 26 November 1996 (1996-11-26) claim 1; figures 1-8	1-9, 14
X	US 5 688 394 A (MCBRIDE JR) 18 November 1997 (1997-11-18)	10
A	column 4, line 25 - line 62; figures 1-4	2-6, 8, 9
X	DE 197 11 429 A (PFENNING MEINIG) 24 September 1998 (1998-09-24) column 1, line 3 - line 21; claim 1; figures 1-3	1, 2, 8-11
	-/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

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Date of mailing of the international search report

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# INTERNATIONAL SEARCH REPORT

Int. Application No.

PCT/IB 00/01114

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 815 878 A (MURAKAMI) 6 October 1998 (1998-10-06) cited in the application figures 1-4	1, 10
A	US 4 512 476 A (HERRINGTON) 23 April 1985 (1985-04-23) figures 1, 2	1, 7, 10, 14

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Information on patent family members

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